



# THE ALLIANCE

Linking Alaska's Resources to Alaska's People

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## CCUS Cliff Notes #1

*The state of Alaska is considering Carbon Capture, Utilization and Storage (CCUS) as a potential new revenue source. The Governor has introduced House Bill 50 and Senate Bill 49, legislation to enact a regulatory framework to support the activity. The bills are currently being considered by the Alaska legislature. In order to help Alliance members better understand the topic and the legislation, we are providing a 3-part series, CCUS Cliff Notes. We hope this is helpful.*

### WHAT IS CARBON CAPTURE UTILIZATION AND STORAGE (CCUS)?

CCS or CCUS, stands for Carbon Capture, Utilization and Storage. This is a low carbon technology which captures carbon dioxide (CO<sub>2</sub>) emissions from industrial facilities such as power generation, iron & steel, fertilizer, cement, chemicals and refining and transports it by either pipeline or ship for utilization or safe and permanent underground storage, preventing it from entering the atmosphere.

There are three stages to CCUS: capture, transport, and utilization or safe storage.

1. Capture - First, the CO<sub>2</sub> is captured at the emitting source and removed. There are three types of capture: post-combustion, pre-combustion and oxyfuel combustion. These capture methods can capture more than 95% of CO<sub>2</sub> emitted,
2. Transport - The CO<sub>2</sub> is then compressed and transported to a suitable storage site or utilization plant. Transport is generally carried out via pipelines and ship.
3. Utilization/Storage - The CO<sub>2</sub> is either utilized as part of a product or injected into a suitable storage site deep under the seabed. The storage site is a carefully selected geological formation that ensures safe and permanent storage. Storage can either take place in depleted oil & gas fields, or deep saline formations.

### WHAT IS UTILIZATION IN CCUS?

Carbon Capture and Utilization uses the same capture processes as CCS except that the captured CO<sub>2</sub> is then utilized in products rather than stored underground. For example, CO<sub>2</sub> can be utilized in cement manufacturing, where the CO<sub>2</sub> is pumped into a cement mix and solidifies into a hard carbonate mineral, preventing it from entering the atmosphere. Other examples of CO<sub>2</sub> utilization include synthetic fuels, the food and beverage industry, dry ice industry and for enhanced oil recovery.

### CAN CCUS ONLY BE APPLIED TO FOSSIL FUEL ELECTRICITY?

No, CCUS is necessary to decarbonize many vital sectors beyond fossil fuel electricity, such as iron & steel, fertilizer, cement, chemicals and energy from waste. It can play an important role in decarbonizing industry.

### **IS CCUS A PROVEN, VIABLE TECHNOLOGY?**

Yes, CCUS is a well-established proven technology with more than 25 years of demonstration in successful CO<sub>2</sub> storage operations. Globally, CCUS deployment has more than doubled over the last decade. [Find data from IEA here.](#)

### **HOW MANY PROJECTS ARE IN OPERATION AROUND THE WORLD?**

The [Global CCS institute](#) reports that there are currently 30 commercially operating CCS facilities, 11 facilities in construction and 153 in various stages of development worldwide. These are located in the USA, China, Australia, the Middle East, Canada and Europe with operations spanning a variety of sectors from iron and steel industries to ethanol bioenergy plants.

### **IS CCUS SAFE?**

CO<sub>2</sub> is stored safely offshore deep underground, typically between 0.8 – 3km down, for thousands of years.

CO<sub>2</sub> storage sites are carefully chosen to ensure the highest confidence in permanent storage and there is rigorous site characterization monitoring and verification procedures in place to ensure the CO<sub>2</sub> stays safely stored. These assessments and procedures are required by CCUS regulations before a project is allowed to proceed.

Many of the potential storage site opportunities are large saline aquifers or depleted oil and gas fields which are well understood and have already stored gas and CO<sub>2</sub> naturally for millions of years.

### **IS TRANSPORTATION OF CARBON DIOXIDE SAFE?**

Yes, in fact carbon dioxide is already regularly transported worldwide. The main options for transportation are by pipeline, ship, truck or rail. Transport by pipeline is currently the cheapest option and has been in practice for many years both on and offshore. For example in the United States alone there are some 8,000km of pipelines actively transporting CO<sub>2</sub> today ([Global CCS Institute](#)).